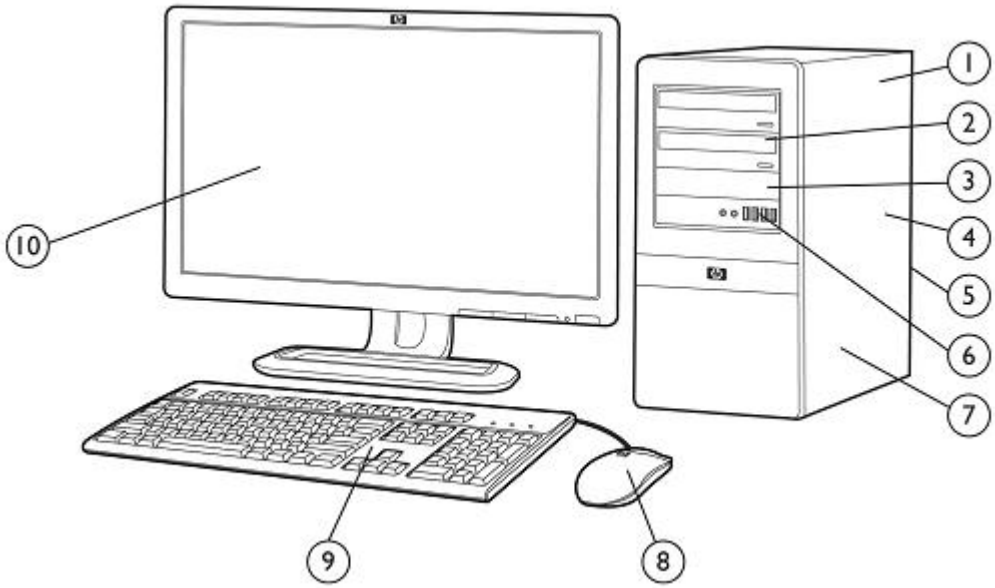
Overview

Microtower



1. 300 watt PFC and non-PFC power supply
2. (2) external 5.25” drive bays for optional optical drives
3. (1) external 3.5” drive bay for optional media reader
4. (3) PCIe x1 slots, (1) PCIe x16 2.0 slot
5. Rear I/O: (6) USB 2.0 ports, (1) RJ-45, (1) 1394, (1) Optical Out, (1) audio in – (1) audio out – (1) MIC – (1) Surround center, – (1) Surround LS – (1) Surround RS
6. Front I/O: (3) USB 2.0 ports, (1) MIC – (1) audio out (Headphone), (1) 1394
7. (2) internal 3.5” hard drive drive bays
8. USB Scroll Mouse
9. HP Standard USB Keyboard
10. Monitor (sold separately)

At A Glance

- Support for Intel® Core™ i5 and Core i7 processors
- Intel P55 PCH chipset
- PCI Express I/O bus
- Serial ATA controller
- Integrated Realtek RTL 8111DL Gigabit Ethernet Controller
- Integrated 1394 port
- Choice of hard drives and optical drives
- Can be configured with multiple hard drives in a RAID array
- DDR3 SDRAM system memory

Standard Features and Configurable Components (availability may vary by country)

Processor and Speed One of the following	**Intel Core i5 Processors:** Intel Core i5-750 Processor (2.66GHz, 8MB L2 cache) **Intel Core i7 Processors:** Intel Core i7-860 Processor (2.8GHz, 8MB L2 cache) Intel Core i7-870 Processor (2.93GHz, 8MB L2 cache) **NOTE:** Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families.
Operating Systems and Application Software (availability varies by region)	Genuine Windows 7 Professional Edition 32* Genuine Windows 7 Professional Edition 64* Windows XP Professional (available through downgrade rights from Genuine Windows 7 Professional)*+ Genuine Windows 7 Home Premium Edition 32* Genuine Windows 7 Home Basic Edition 32* Genuine Windows Vista Business 32** Windows XP Professional (available through downgrade rightsfrom Genuine Windows Vista Business)**++ Novell SUSE Linux Enterprise Desktop 11† FreeDOS **Certified**: Red Hat Enterprise Linux† Novell SUSE Linux Enterprise Desktop†

NOTE: Windows XP Mode, available as a separate download for Windows 7 Professional, works with virtualization software such as Windows Virtual PC to run older Windows XP business software on the Windows 7 desktop.

* Offered when Windows 7 is generally available. System may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See: http://www.microsoft.com/windows/windows-7/ for details.

** Certain Windows Vista product features require advanced or additional hardware. See: http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx and: http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor.

+ Windows 7 Professional disk may also be included for future upgrade if desired. To qualify for this downgrade an end user must be a business (including governmental or educational institutions) and is expected to order annually at least 25 customer systems with the same custom image.

++ Windows Vista Business disk may also be included for future upgrade if desired. To qualify for this downgrade an end user must be a business (including governmental or educational institutions) and is expected to order annually at least 25 customer systems with the same custom image.

† The following features are not supported by Linux:

Standard Features and Configurable Components (availability may vary by country)

- Integrated 1394 port
- Intel Gigabit CT Desktop NIC
- LSI PCIe x1 56K International SoftModem
- HP Wireless 802.11 b/g/n PCIe x1 Card
- NVIDIA GeForce G210 HDMI PCIe x16 graphics card
- NVIDIA GeForce GT230 (1.5GB) PCIe x16 graphics card
- ATI Radeon HD 4550 (256MB DH) PCIe x16 graphics card
- ATI Radeon HD 4650 (1GB DH) PCIe x16 graphics card
- Belkin USB to serial adapter
- 22-in-1 Media Reader

Microsoft Office 2007 Basic
Microsoft Office 2007 Small Business
Microsoft Office 2007 Professional
HP Backup and Recovery Manager
Intel Matrix Storage Manager

Mozilla Firefox for HP Virtual Solutions
Roxio Easy Media Creator 10*
Intervideo WinDVD 8*
McAfee Total Protection Anti-Virus**
PDF Complete

* Supporting software available with certain optical drive configurations
** 60 day trial period for McAfee Total Protection for Small Business software. Internet access required to receive updates. First update included. Subscription required for updates thereafter.

Internal Storage
(3.5-inch SATA)

Hard Drives

160 GB Hard Drive
8MB cache, 7,200 RPM, 3.0 GB/s, NCQ, Smart IV

500 GB Hard Drive
16MB cache, 7,200 RPM, 3.0 GB/s, NCQ, Smart IV

1 TB Hard Drive
16MB cache, 7,200 RPM, 3.0 GB/s, NCQ, Smart IV

Solid State Drive

64-GB Solid State Drive

Standard Features and Configurable Components (availability may vary by country)

System Memory	1-GB DDR3 Synch DRAM PC3-10600 (1333-MHz) Non-ECC (1 x 1GB) 2-GB DDR3 Synch DRAM PC3-10600 (1333-MHz) Non-ECC (2 x 1GB) 2-GB DDR3 Synch DRAM PC3-10600 (1333-MHz) Non-ECC (1 x 2GB) 3-GB DDR3 Synch DRAM PC3-10600 (1333-MHz) Non-ECC (3 x 1GB) 4-GB DDR3 Synch DRAM PC3-10600 (1333-MHz) Non-ECC (4 x 1GB) 4-GB DDR3 Synch DRAM PC3-10600 (1333-MHz) Non-ECC (1 x 4GB) 4-GB DDR3 Synch DRAM PC3-10600 (1333-MHz) Non-ECC (2 x 2GB) 6-GB DDR3 Synch DRAM PC3-10600 (1333-MHz) Non-ECC (3 x 2GB) 8-GB DDR3 Synch DRAM PC3-10600 (1333-MHz) Non-ECC (4 x 2GB) 8-GB DDR3 Synch DRAM PC3-10600 (1333-MHz) Non-ECC (2 x 4GB) **NOTE:** For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.
Removable Storage One or more of the following (see Storage section below)	**Media Reader** HP 22-in-1 Media Reader and additional USB 2.0 port **Optical Drives (Serial ATA)** SATA DVD-ROM Drive SATA SuperMulti LightScribe DVD Writer Drive HP SATA Blu-ray Writer
Input Devices	**Keyboard – One of the following** HP USB Standard Keyboard HP USB Mini Keyboard HP Washable Keyboard HP USB Smartcard Keyboard HP 2.4 GHz Wireless Keyboard and Mouse **Mouse – One of the following** USB 2-Button Optical Scroll Mouse USB 2-Button Laser Mouse
Audio/Visual	Realtek ALC888S High Definition audio codec 3D audio compliant with AC'97 Rev. 2.3 and HD Audio compatible HP Thin USB Powered Speakers HP USB 2.0MP Business Webcam

Standard Features and Configurable Components (availability may vary by country)

Communication	Integrated Realtek RTL8111DL Gigabit Ethernet Controller Intel Gigabit CT Desktop NIC LSI PCIe x1 56K International SoftModem HP Wireless 802.11 b/g/n PCIe x1 Card (full height)
Graphics	NVIDIA GeForce G210 HDMI PCIe x16 Graphics Card NVIDIA GeForce GT230 1.5GB PCIe x16 Graphics Card ATI Radeon HD 4550 Dual Head PCIe x16 Graphics Card ATI Radeon HD 4650 1GB PCIe x16 Graphics Card
Miscellaneous	Belkin USB to serial adapter

System Details

Base Unit

- MT: Micro ATX Microtower chassis, including power supply and front bezel; five (5) drive bays and four expansion slots
- Active type heatsink
- 92 x 92 x 25 mm chassis fan for Microtower chassis
- System board with Intel P55 PCH chipset, RTL8111DL Gigabit Ethernet controller and Realtek audio, (3) PCI Express x1 slots, (1) PCI Express x16 slot, (4) DDR3 DIMM memory slots, (4) Serial ATA data connectors, (10) USB Ports (see USB support below), 1394 Firewire, Optical Out
- Power cord

Slots

PCI	PCI Express x1 slots (3) full-height (4.34”), length (6.6”), Max power per slot 10W PCI Express x16 2.0 slot (for graphic cards) (1) full-height (4.34”), length (9.5”), Max power per slot 75W
Memory Expansion	Four (4) DDR3 SDRAM DIMM slots (8 GB maximum memory support)

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

Bays

Internal	Two (2) 3.5-inch
External	Two (2) 5.25-inch; One (1) 3.5-inch

USB Support

EHCI high-speed USB 2.0 controller

Three (3) front ports; six (6) rear ports, five (5) internal ports on system board

Other Ports

Front:
(1) audio out; (1) microphone in, (1) 1394 port
Rear:
(1) Digital Out
(1) audio in, (1) audio out; (1) microphone in, (1) surround rear, (1) surround side,
(1) center/sub
(1) RJ-45 network port
(1) 1394 port
(6) USB ports

Weight & Dimensions

Chassis Dimensions (H x W x D)	15.14 x 7.27 x 16.36 in 385 x 185 x 416 mm
Packaged Dimensions (L x W x H)	19.13 x 21.875 x 10.13 in 490 x 556 x 257 mm
System Weight	22.4 lb (10.2 kg)
Shipping Weight	30.8 lb (14.0 kg)

System Details

Technology and Features	**Memory Type**	PC3-10600 DDR3 (1333 MHz) non-ECC Up to 8 GB system memory standard
	NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.	
	Hard Drive Interfaces Supported	Serial ATA
RAID	**Redundant Array of Independent Drives**	

RAID 0,1 are the RAID configurations that HP Elite 7000 Microtower PC products offer as factory configurations. The pre-configured systems:

- Are complete RAID systems and have both drives installed.
- Have the necessary Option ROM configuration.
- Are pre-loaded and pre-installed with all required Intel software.
- Include a preinstalled operating system that is in mirrored mode out of the box.

SMART Technology* (Self-Monitoring, Analysis and Reporting Technology)

Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted

- Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count
- By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure
- IOEDC: I/O Error Detection Circuitry
- Detects errors in Read/Write buffers on HDD cache RAM
- Interface in F10 setup provides confirmation of SMART support.

* This feature is inoperable when a RAID configuration is enabled.

Chassis	**Front Panel**	Power button Power On LED HDD Activity LED
	Cooling Solutions Supported	Power Supply Fan (variable speed) Active heatsink (variable speed) Chassis fan (variable speed) (MT only)
	Slots Supported	(3) PCI Express x1 slots, (1) PCI Express x16 slot
	Front I/O	Three (3) USB 2.0 ports, 1394, Headphone, Mic
	Rear I/O	Standard Micro ATX I/O connectors, including six (6) USB 2.0 ports
	Drive Bays (MT)	Two (2) 5.25-inch (13.335 cm) half height external One (1) 3.5-inch (8.89 cm) half height external Two (2) 3.5-inch (8.89 cm) half height internal
	Internal Speaker	Not supported

System Details

	Security	Padlock loop
		Support for chassis padlocks and cable lock devices
		Kensington Lock Support
	Power Supply	MT: 300-watt ATX Power Supply – PFC/non-PFC with a 115v/230v line switch (varies by country/region)

Unit Environment and Operating Conditions

General Unit Operating Guidelines

- Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.
- Leave a 4 in (10.2 cm) clearance on all vented sides of the computer to permit the required airflow.
- Never restrict airflow into the computer by blocking any vents or air intakes.
- Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.
- Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.
- If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.

Temperature Range	**Operating**	41° to 95° F (5° to 35° C)
	Non-operating	–22° to 140° F (–30° to 60° C)
Relative Humidity	**Operating**	15% to 80% (non-condensing at ambient)
	Non-operating	90% (non-condensing at ambient)
Maximum Altitude (unpressurized)	**Operating**	7500 ft (2286 m)
	Non-operating	15,000 ft (4572 m)

NOTE: Operating temperature is de-rated 1.0 deg C per 1000 ft (300 m) to 7500 ft (2286 m) for MT and 10000 ft (3000m) for SFF above sea level, no direct sustained sunlight. Maximum rate of change is 7.5 deg C/Hr for MT and 10 deg C/Hr for SFF. The upper limit may be limited by the type and number of options installed.

System Board

Processor	Socket LGA1156 industry standard Micro ATX form factor
	Intel Core i5 or Core i7 processors
PWM	Intersil ISL6338 – 3 phase
Chipset	Intel P55 PCH Chipset
Super I/O	N/A
Memory Bus Frequency	1333 MHz
Memory	DDR3 SDRAM
	4 x DIMM slots
Clock Generator	N/A
Audio	Realtek ALC888S HD Audio compatible codec with two channel audio 3D audio compliant with AC'97 rev. 2.3
LOM	Realtek RTL8111DL Gigabit Ethernet
Storage	Four Serial ATA interfaces

System Details

Expansion Slots	3 x PCI Express x1 slots
	1 x PCI Express x16 slot
BIOS	SPI FLASH ROM
Industrial Standard	PCIe compliant
	USB 2.0
Rear Side I/O Ports	6 x USB 2.0 ports
	1 x RJ-45 10/100 port
	1 x 1394 port
	1 x Digital Out
	6 x audio ports
On Board I/O Interfaces	1 x ATX power connector
	1 x +12V power connector
	1 x Front panel connector, Switch, LED (ON/Flash/OFF)
	2 x Fan headers for CPU, chassis, with voltage/fan speed control
	2 x header (1 -2x5, 1-1x5) to support 3 USB 2.0 ports at front side
	1 x header (1 – 2x5) to support USB Card Media Reader
	3 x headers (1 –1x5) to support additional USB devices
	1 x header 2x5 to support 2 front (Headphone/Mic) audio ports
	1 x header 2x5 to support 1 front IEEE 1394
Board Size	Micro-ATX, PCB Size: 9.6 x 9.6 in (24.38 x 24.38 cm)
	4-layer PCB with green color
Additional Features	Bootable without keyboard, mouse or monitor
	Keyboard/mouse/USB wake up
	Support S3, S4 and S5
	ACPI status
	Hardware monitor capability
	CPU fan speed control

Network Interface	Integrated Realtek RTL8111DL Gigabit NIC Intel Gigabit CT Desktop NIC (optional)

Wireless	Wireless 802.11b/g/n PCIe Card (full height bracket)

System Details

Power Supply

- ATX Power Supply – Passive PFC
- Passive Power Factor Correction (PFC/NPFC) – with line switch set to 230V – No PFC in 115V line switch position
- 90 to 140VAC, or 180 to 264VAC operating voltage range
- 100 to 127VAC, or 200 to 240VAC rated voltage range
- 50–60 Hz rated line frequency
- 47–63 Hz operating line frequency range
- 300 watt maximum rated power
- 80-mm power supply fan – variable speed for optimum acoustics

Power Conservation 'Energy Saver'

- APM 1.2 support
- Screen blanking
- Hard drive 'Idle' mode
- System Idle mode
- ~2 watt power consumption in ES mode - suspend to RAM (S3) (instantly available PC)
- Processor/Cache memory power-down (S3)
- S5 Max Power Savings (<1W) for Eup Lot 6 compliance

System Environmental Specs

- Values are subject to change without notification and are for reference only.
- Performance of system, options, and ancillary equipment will vary depending on the system configuration.
- Levels presented do not account for non-HP/Compaq installed hardware.

Ambient Air Temperature	**Operating**	MT: Operating 41° to 95°F (5 to 35°C) (Test 0 to 104°F (40°C)); SFF: 50° to 95°F (10° to 35°C) at sea level with an altitude de-rating of 1.0°C per every 1000 ft (300 m) above sea level to a maximum of 10,000 ft (3000 m), no direct sustained sunlight. Maximum rate of change is 77°F/Hr (25°C/Hr). The upper limit may be limited by the type and number of options installed.
	Storage	MT: Storage: 90% RH @ 60°C for 12 hours (Non-condensing) SFF: -22° to 140°F (-30° to 60°C) - Maximum rate of change: 410°F/Hr (210°C/Hr).
Humidity	**Operating**	15% to 80% relative humidity (Rh), 35°C non-condensing
	Storage	90% relative humidity (Rh), 60°C for 12 hours, non-condensing).
Altitude	**Operating**	0 to 7,500 feet (0 to 2286 meters) – This value may be limited by the type and number of options installed.
	Non-Operating	0 to 15,000 feet (0 to 4572 meters)

System Details

Shock	Listed are the levels of shock the product can withstand with No damage being incurred. The values represent peak input acceleration during an 2~3 ms half-sine shock pulse, 11 ms trapezoidal shock pulse.	
	Non-Operating	35G's (Half-sine Shock) 35G's (Trapezoidal Shock)
Vibration	Listed are the levels of vibration the product can withstand with No damage being incurred. The values represent a flat random vibration input acceleration profile across the given frequency range.	
	Operating	MT: Random Operating: ~0.21Grms (5-500 Hz) Swept Sine: 0.5g (5-500Hz) 5 min. dwell at 4 resonance's 5Hz to 300Hz, (0.25G's nominal). SFF: Random vibration at 5Hz@0.00025G²/Hz, 10Hz@0.01G²/Hz, 100Hz@0.01G²/Hz, 300Hz@0.00001G²/Hz 5Hz to 300Hz, (0.25G's nominal).
	Non-Operating	MT: ~2.09Grms (5-500Hz), Non-Operational SFF: Random vibration at 0.008G²/Hz, 10Hz to 500Hz, (2 Grms nominal).

Service and Support

On-site Warranty[Note 1]: One-year (1-1-1) limited warranty delivers one year of on-site, next business-day[Note 2] service for parts and labor and includes free telephone support[Note 3] 24 x 7. Global coverage[Note 2] ensures that any product purchased in one country and transferred to another non-restricted country will remain fully covered under the original warranty and service offering. One-year onsite and labor are not available in all countries.

NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.

NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.

NOTE 3: Technical telephone support applies only to HP-configured Compaq and third-party HP-qualified hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.

After-Market Options (availability may vary by country)

Communications	**NICs**	
	Intel Gigabit CT Desktop NIC PCIe x1	FH969AA
	Wireless LAN	
	HP Wireless 802.11/b/g/n PCIe x1	FH971AA
	Modems	
	LSI PCIe x1 56K International SoftModem	FH970AA
Hard Disk Drives	HP 500-GB SATA 3.0-Gb/s Hard Drive	KW347AA
	HP 250-GB SATA 3.0-Gb/s Hard Drive	PY278AA
	HP 160-GB SATA 3.0-Gb/s Hard Drive	PY277AA
External Storage Devices	HP 250-GB Pocket Media Drive	FE477AA
Removable Storage Devices	22-in-1 Media Reader	FX273AA
Input Devices	HP USB Standard Keyboard	DT528A
	HP Washable Keyboard	VF097AA
	HP Mini Keyboard	AS601AA
	HP 2.4 GHz Wireless Keyboard and Mouse	NB896AA#xxx
	HP USB 2-Button Optical Scroll Mouse	DC172B
	HP USB 2-Button Laser Mouse	GW405AA
Memory	HP 1-GB PC3-10600 (DDR3 1333-MHz) DIMM	AT023AA
	HP 2-GB PC3-10600 (DDR3 1333-MHz) DIMM	AT024AA
	HP 4-GB PC3-10600 (DDR3 1333-MHz) DIMM	VH638AA
Audio/Visual	HP Thin USB Powered Speakers	KK912AA
	HP USB 2.0MP Business Webcam	NX252AA
Graphics	ATI Radeon HD 4550 Dual Head PCIe x16 Graphics Card	AT042AA
	ATI Radeon HD 4650 PCIe x16 Graphics Card	AR956AA
	NVIDIA GeForce G210 HDMI SH PCIe x16 Graphics Card	VN565AA

After-Market Options (availability may vary by country)

Optical Drives	HP SATA DVD-ROM Drive	AH047AA
	HP SATA SuperMulti LightScribe DVD Writer Drive	GF343AA
	HP SATA Blu-ray Writer (black)	AR482AA
Security	HP Business PC Security Lock Kit	PV606AA
	Security Cable with Kensington Lock	PC766A
	HP USB Smartcard Keyboard	ED707AA
Miscellaneous Accessories	Belkin Serial to USB adapter	EM449AA

Memory

DDR3 SYNCH DRAM NON-ECC MEMORY

The Intel P55 chipset supports non-ECC DDR3 memory up to PC3-16000 (1333-MHz). Memory upgrades are accomplished by adding single or multiple DIMMs of the same or varied sizes. This chart does not represent all possible memory configurations.

CAUTION: You must shut down the computer **and disconnect the power cord** before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged in to an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

HP recommends dual-channel symmetric configurations for maximum performance.

For best performance, add the same amount of total memory to each channel and do not mix speeds. For dual-channel symmetric performance, the total amount of memory in each channel must be equal. If speeds are mixed, speed will default to the slowest DIMM.

STANDARD MEMORY

1-GB, 2-GB or 4GB DDR3 SYNCH DRAM

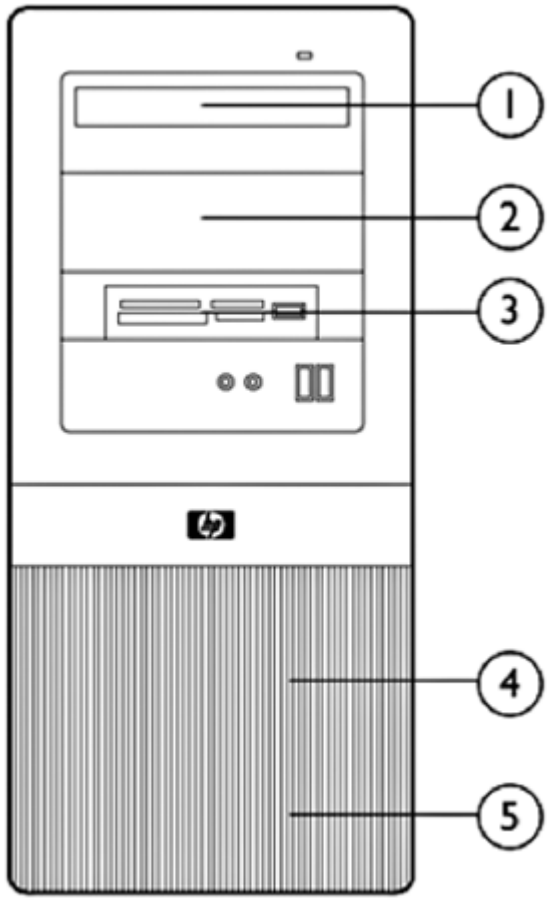
OPTIONAL MEMORY UPGRADES

Supports up to 8-GB of DDR3 SYNCH DRAM. Not all memory configurations possible are represented below.

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

DIMM Size	Slot 1 (Black)	Slot 2 (Blue)	Slot 3 (Black)	Slot 4 (Blue)
1-GB		1-GB		
2-GB (dual-channel symmetric)	1-GB	1-GB		
4-GB (dual-channel symmetric)	1-GB	1-GB	1-GB	1-GB
4-GB (dual-channel symmetric)	2-GB	2-GB		
8-GB (dual-channel symmetric)	2-GB	2-GB	2-GB	2-GB

Storage



HP Elite 7000 Microtower PC

Drive Support	Maximum Quantity Supported	Position Supported	Controller
Media Reader	1	3	Internal USB 2.0 port
CD-ROM Drives	2	1, 2	SATA
DVD-ROM Drives	2	1, 2	SATA
DVD+/-RW Drives	2	1, 2	SATA
3.5” Serial ATA Devices	2	4, 5	SATA

Technical Specifications - Audio

Integrated Realtek ALC888S Audio	**Type**	Integrated	2-channel
	HD Audio compatible codec	Yes	
	Sampling	Supports 48/96 KHz	
	Audio Jacks	Mic-In	
		Line-In	
		Line-Out / Headphone Out	
		Center/Sub	
		Surround Side	
		Surround Rear	
	Power Support	Digital: 3.3V	
		Analog: 5V	
	Other	Meets performance requirements for audio on PC99/2001 systems High-performance DACs with 97dB SNR(A-Weighting) ADCs with 90dB NR(A-Weighting)	

Technical Specifications - Communications

Integrated Realtek RTL8111DL Gigabit Ethernet Controller	**Connector**	RJ-45
	Controller	RTL 8111DL
	Memory	N/A
	Data rates supported	10/100/1000 Mbps
	Compliance	IEEE 802.3 compliant, 802.3x flow control
	Bus architecture	PCI Express 1.1
	Data transfer mode	Bus-master DMA
	Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	Power requirement	588.5mW – 1000mbps 322.3mW – 100mbps 278.3mW – 10mbps S3 – 195.8mW
	Boot ROM support	Yes
	Network transfer rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI Bus)
	Environmental	**Operating temperature** 32° to 120°F (0° to 48.89° C) **Operating humidity** 85% at 120°F (48.89° C)
	Dimensions	68Pin QFN (9mm x 9mm x 0.85mm)
	Management capabilities	WOL, PXE, (WOL supported from S1, S3, S4 states only. Not supported from S5 state).

Intel Gigabit CT Desktop NIC	**Connector**	RJ-45
	Controller	Intel WG82574L Gigabit Ethernet Controller
	Memory	Integrated Dual 48K configurable transmit receive FIFO Buffers
	Data rates supported	10/100/1000 Mbps
	Compliance	IEEE 802.1P, 802,1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	Bus architecture	PCI-E 1.0a
	Data path width	X1, 250 MB/s, Bi-directional interface
	Data transfer mode	Bus-master DMA
	Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	Power requirement	Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T
	Boot ROM support	Yes

Technical Specifications - Communications

	Network transfer rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI Bus)	
	Environmental	**Operating temperature**	32° to 131°F (0° to 55° C)
		Operating humidity	85% at 131° F (55° C)
	Dimensions	4.75 x 2.25 x 0.8 in (12.1 x 5.7 x 2.0 cm)	
	Management capabilities	WOL, PXE, DMI, WFM 2.0	

HP Wireless 802.11b/g/n PCIe	**Dimensions** (L x H)	3.3 x 4.7 inches (8.5 x 12 cm)		
	Weight	0.08 pounds (40 g)		
	Controller	Ralink RT2790		
	System interface	PCIExpress x1		
	Network standard	802.11 b/g/n		
	Frequency band	2.400 - 2.497 GHz		
	Operating temperature	14° to 149°F, operating (-10° to 65°C, operating)		
	Storage temperature	-40° to 176°F, non-operating (-40° to 80°C, non-operating)		
	Humidity	10-90% operating 5-95% non-operating		
	Operating voltage	3.3V +/- 9% 12V +/- 8%		
	Power consumption	Platform/WLAN Mode	Power Consumption	
		Maximum Power Consumption	10 Watts	
		Transmit Only	4 Watts maximum averaged power over 1 second	
		Transmit Packet or Active Scanning	1000 mA peak current for 100 microseconds or longer	
		Receive Only Mode or Idle without IEEE PSP mode enabled	3 Watts maximum averaged over 1 second	
		Idle, with IEEE PSP mode enabled	1.0 Watts maximum averaged over 1 second	
		Transmit Disabled (turned off in software)	50 mW maximum, averaged over 1 second	
		Platform in S3 or S4 (power removed from Low Profile PCI Express Card)	5 mW maximum, averaged over 1 second	
	Output power (approximately)	**802.11b modes**	**802.11g modes**	**EWC modes**
		+19 dBm +/- 1.0 dB maximum	+17 dBm +/- 1.0 dB maximum	+17 dBm +/- 1.0 dB maximum (total power in all transmit chains)

Technical Specifications - Communications

Receive sensitivity	**Mode**	**Data rate**	**Sensitivity**
	802.11b	1 Mbps	-94 dBm
	802.11b	11 Mbps	-85 dBm
	802.11g	6 Mbps	-91 dBm
	802.11g	18 Mbps	-85 dBm
	802.11g	48 Mbps	-75 dBm
	802.11g	54 Mbps	-72 dBm
	EWC (2.4 GHz)	6.5 Mbps	-87 dBm
	EWC (2.4 GHz)	54 Mbps	-82 dBm
	EWC (2.4 GHz)	81 Mbps	-78 dBm
	EWC (2.4 GHz)	162 Mbps	-74 dBm
	EWC (2.4 GHz)	270 Mbps	-68 dBm
	EWC (2.4 GHz)	300 Mbps	-64 dBm
Data transfer rate	**Data Rate** (MCS)	**Minimum Throughput**	
	1 Mbps (802.11 b)	700 kbps	
	2 Mbps (802.11 b)	1.4 Mbps	
	5.5 Mbps (802.11 b)	3.5 Mbps	
	11 Mbps (802.11 b)	5.9 Mbps	
	12 Mbps (802.11 g)	6 Mbps	
	18 Mbps (802.11 g)	9 Mbps	
	24 Mbps (802.11 g)	12 Mbps	
	36 Mbps (802.11 g)	18 Mbps	
	48 Mbps (802.11 g)	21 Mbps	
	54 Mbps (802.11 g)	22.5 Mbps	
	6.5 Mbps (20 MHz EWC)	4.5 Mbps	
	13 Mbps (20 MHz EWC)	9 Mbps	
	19.5 Mbps (20 MHz EWC)	13.5 Mbps	
	26 Mbps (20 MHz EWC)	18 Mbps	
	39 Mbps (20 MHz EWC)	27 Mbps	
	52 Mbps (20 MHz EWC)	36 Mbps	
	58.5 Mbps (20 MHz EWC)	40 Mbps	
	65 Mbps (20 MHz EWC)	45 Mbps	
	78 Mbps (20 MHz EWC)	54 Mbps	
	104 Mbps (20 MHz EWC)	72 Mbps	
	117 Mbps (20 MHz EWC)	81 Mbps	
	130 Mbps (20 MHz EWC)	91 Mbps	
	13.5 Mbps (40 MHz EWC)	8 Mbps	
	27 Mbps (40 MHz EWC)	16 Mbps	
	40.5 Mbps (40 MHz EWC)	24 Mbps	
	54 Mbps (40 MHz EWC)	32 Mbps	
	81 Mbps (40 MHz EWC)	48 Mbps	

Technical Specifications - Communications

		108 Mbps (40 MHz EWC) 64 Mbps 121.5 Mbps (40 MHz EWC) 72 Mbps 135 Mbps (40 MHz EWC) 81 Mbps
	Security	• IEEE and WiFi compliant 64 / 128 bit WEP encryption • AES: CCM • 802.1x authentication • WPA: 802.1x. WPA-PSK and TKIP • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through V5
	Antenna	HP part number 497792-001
	Certifications	Wi-Fi certified
	Certifications for use by country	United States, Canada, Peru, Taiwan
LSI PCIe x1 56K International SoftModem	**Data Transmission**	Technology speeds: 56,000 Kbps maximum downstream data, controllerless **NOTE:** 56 Kbps technology refers to download speeds only and requires compatible modems at server sites. Other conditions may limit modem speed. FCC limitations allow a maximum of 53 Kbps during download transmissions.
	Data Speeds	(Upload only) 33,600/31,200/28,800/26,400/21,600/19,200/ 16,800/14,400/12,000/9,600/7,200/4,800/2,400/1,200/300
	Data Standards	ITU-T V.90, ITU-T, ITU-T V.34, V.44, V.42, V.42bis21, V.32bis, Bell 212A, and Bell 103
	Fax Speeds	14,400/12,000/9,600/7,200/4,800/2,400/1,200/300 b/s
	Fax Mode Capabilities	ITU-T T.31 class 1 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2
	Error Correction and Data Compression	V.44, 42bis, V.42 and MNP2-5
	Power Management	PCI Bus Power Management Interface Specification (PCI-PM) Revision 1.2, Appendix A. D0, D3hot, and D3cold. Wake on Ring state when in D3cold. If the power management event (PME) feature is enabled in D3cold, a modem can wake the system via WAKE# (WAKEN) or beacon. Meets PCI Express 1.1 standard.
	Upgradeability	Driver upgradeable for future enhancements
	Video	ITU-T V.80 video ready interface
	Other	TIA/EIA 602 standard AT command set Integrated DTE interface with speeds of up to 115.2 Kbps, parallel 16550a UART-compatible interface Optional ring wakeup signal
	Operating Temperature	32° to 158° F (0° to 70° C)
	Operating Humidity	20% to 90%, non-condensing
	Power	Requires a 3.3-V auxiliary power rail on PCI express bus Uses only one PCI express load (i.e., one grant/request pair), one shared IRQ, one electrical load

Technical Specifications - Communications

Chipset	LSI SV92EX - Integrated PCI interface with 3.3-V tolerant buffers and CardBus support
Dimensions (L X H)	Complies with PCI express low profile specifications-6.7 x 2.3 in (17.0 x 5.8 cm) and supports high- and low-profile brackets
Connection	Single RJ-11 connector
Other Features	Digital line protection, call progress monitoring via on-board piezo device, support for high profile and low profile brackets, PnP ID support
Safety	UL recognized to UL 1950, 3rd edition (U.S. and Canada); IEC 950 (TUV, NEMKO, DEMKO, SEMKO); CE Mark, EC 950 (TUV, NEMKO, DEMKO, SEMKO, CE mark
EMC	FCC Part 15, IC ES003, EN 55022, 3rd edition, EN 55024, annex A, EN 61000-4-6, EN 61000-4-8
Telecom	FCC Part 68, IC-CS-03 (Canada); Worldwide PTT approvals Not available in Korea or the Republic of South Africa.
Other	The SV92EX device is packaged in a 32-pin micro leadless chip carrier (MLCC). The SV92EX is fully compliant with the PCI Express revision 1.1 specification. WHQL approved; ASPM compliant.

Technical Specifications - Graphics

NVIDIA GeForce GT230 1.5GB PCIe x16 Graphics Card	**Bus type**	PCI Express (x16 lanes)	
	Input/Output connectors	DVI, VGA and HDMI	
	Board display options	Supports two displays through any combination of two of the three output ports.	
	Board configuration	**Specification**	**Description**
		Graphics Chip	NVIDIA GeForce GT230
		Core clock	550 MHz
		Memory clock	500 MHz
		Frame buffer	768MB DDR2
	Maximum vertical refresh rate	85 Hz	
	Display support	Integrated 400 MHz RAMDAC	
	Display max resolution	2048 x 1536 (analog), 2560x1600 (digital)	

NVIDIA GeForce GT230 768MB PCIe x16 Graphics Controller display resolutions and refresh rates

NOTE: Other resolutions may be available but are not recommended as the may not have been tested and qualified by HP.

Resolution	Maximum Refresh Rate (Hz)	
	Analog Connection	Digital Connection
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R*
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	60**

* Max HDMI resolution is 1080p

** Only supported when using a dual-link DVI connection

NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections

	Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish
	Maximum power	70W
	Compliance standards	EMC Emissions: a. CISPR22: 1997/EN 55022:1998 - Class B - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment

EMC Immunity:
CISPR 24:1997/EN 55024:1998 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement.

ATI Radeon HD 4550 Dual Head PCIe x16 Graphics Card	**Input/Output connectors**	DMS-59 S-video connector	
	Board display options	Supports two displays via included DMS-59 to dual VGA cable or 2 DVI monitors via optional DMS-59 to dual DVI cable kit part number: DL139A. 4-pin mini-DIN S-video connector for TV output	
	Board configuration	**Specification**	**Description**
		Graphics Chip	RV710
		Core clock	600 MHz
		Memory clock	800 MHz
		Frame buffer	256 MB DDR2, 64 bit wide
	Bus type	PCI Express (x16 lanes)	
	Maximum vertical refresh rate	85 Hz	
	Display support	Integrated 400 MHz RAMDAC	
	Display max resolution	1900 x 1200 digital, 2048 x 1536 analog	

ATI Radeon HD 4550 DH PCIe x16 Graphics Card display resolutions and refresh rates

NOTE: Other resolutions may be available but are not recommended as the may not have been tested and qualified by HP.

Resolution	Maximum Refresh Rate (Hz)	
	Analog Connection	Digital Connection
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	N/A

NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections.

	Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish
	Core power	21 W
	Compliance standards	EMC Emissions: a) FCC Part 15, Subpart B – Unintentional Radiators, Class B Computing Devices for Home & Office Use

b) CISPR22: 1997/EN 55022:1998 – Class B – Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment
c) Canadian Standard ICES-003 is equivalent to CISPR22
d) Taiwanese Standard BSMI
e) Japanese VCCI
f) Australian C-Tick
g) Korean (KCC)

EMC Immunity:
CISPR 24:1997/EN 55024:1998 – Information Technology Equipment - Immunity Characteristics – Limits and Methods of Measurement.

ATI Radeon HD 4650 1 GB PCIe x16 Graphics Card

Bus type	PCI Express (x16 lanes)
Maximum vertical refresh rate	85 Hz
Display support	Integrated 400 MHz RAMDAC
Display max resolution	2560 x 1600 digital, 2048 x 1536 analog

ATI Radeon HD 4650 1 GB PCIe x16 Graphics Card display resolutions and refresh rates

NOTE: Other resolutions may be available but are not recommended as the may not have been tested and qualified by HP.

Resolution	Maximum Refresh Rate (Hz)	
	Analog Connection	Digital Connection
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R*
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	60**

* Max HDMI resolution is 1080p
** Only supported when using a dual-link DVI connection
NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections.

Board display options Supports two displays through any combination of two of the three output ports.

Board configuration	**Specification**	**Description**
	Graphics Chip	RV730Pro
	Core clock	600MHz
	Memory clock	500 MHz
	Frame buffer	1 GB DDR2, 128 bit wide

Technical Specifications - Graphics

Maximum power	55 W
Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish
Compliance standards	EMC Emissions: a) CISPR22: 1997/EN 55022:1998 – Class B – Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment EMC Immunity: CISPR 24:1997/EN 55024:1998 – Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement.

Technical Specifications - Input Devices

HP USB Standard Keyboard	**Physical characteristics**	**Keys**	104, 105, 106, 107, 109 layout (depending upon country)
		Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
		Weight	2 lb (0.9 kg) minimum
	Electrical	**Operating voltage**	+ 5VDC ± 5%
		Power consumption	50-mA maximum (with three LEDs ON)
		ESD	CE level 4, 15-kV air discharge
		EMI - RFI	Conforms to FCC rules for a Class B computing device
		MicrosoftPC 99 - 2001	Functionally compliant
	Mechanical	**Languages**	38 available
		Keycaps	Low-profile design
		Switch actuation	55-g nominal peak force with tactile feedback
		Switch life	20 million keystrokes (using Hasco modified tester)
		Switch type	Contamination-resistant switch membrane
		Key-leveling mechanisms	For all double-wide and greater-length keys
		Cable length	6 ft (1.8 m)
		Microsoft PC 99 - 2001	Mechanically compliant
		Acoustics	43-dBA maximum sound pressure level
	Environmental	**Operating temperature**	50° to 122° F (10° to 50° C)
		Non-operating temperature	-22° to 140° F (-30° to 60° C)
		Operating humidity	10% to 90% (non-condensing at ambient)
		Non-operating humidity	20% to 80% (non-condensing at ambient)
		Operating shock	40 g, six surfaces
		Non-operating shock	80 g, six surfaces
		Operating vibration	2-g peak acceleration
		Non-operating vibration	4-g peak acceleration
		Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
		Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
	Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
	Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	
HP USB Smartcard Keyboard	**Physical characteristics**	**Keys**	104, 105, 106, 107, 109 layout (depending upon country)
		Form factor	USB basic Smart Card keyboard
		Colors	Carbonite/Silver
		Dimensions (H x W x D)	18.2 x 6.3 x 1.3 in (46.3 x 16.1 x 3.3 cm)

Technical Specifications - Input Devices

	Weight	2 lb (0.9 kg) minimum
Electrical	**Operating voltage**	+ 5VDC ± 5%
	Power consumption	100-mA maximum (with four LEDs ON)
	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft PC 99 - 2001	Functionally compliant
Mechanical	**Languages**	30+ available
	Keycaps	Low-profile design
	Switch actuation	55 g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	Switch type	Contamination-resistant membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Microsoft PC 99 - 2001	Mechanically compliant
	Acoustics	43-dBA maximum sound pressure level
Environmental	**Operating temperature**	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
Approvals	CE-Mark, UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, JITC, EMV2000, USB-IF, FIPS 201	
SMARTCARD function	**Support**	All ISO 7816 smart cards
	Interface	Reads from and writes to all ISO7816-1, 2, 3, 4 memory and microprocessor smart cards (T=0, T=1)
	Chipset	SCM STCII
	Standard APIs supported	PC/SC, EMV2000, SET

Technical Specifications - Input Devices

	Power	USB Port Short circuit detection (protects smart card and reader) Power supply compliant with ISO7816 and EMV (5V, 60 mA) Supports 3-V and 5-V cards	
	Power consumption	250-mA maximum draw (50 mA for the keyboard with three LEDs ON and 200-mA maximum startup current using a high-current, 60-mA smart card)	
	Communication	**From card**	Programmable from 9,600 baud to 115,200 baud
		From computer	Up to 38,400 baud
	Landing mechanism	**Contact device**	Friction contact
		Card insertions rating	Up to 100,000 insertion cycles
	Interface modes	USB communications through USB port SCM protocol Automatic card insertion/removal detection	
	Reader performance interface	USB connection	
	Electro-magnetic standards	**Europe**	89/336/CEE guideline
		USA	USAFCC part 15

HP USB 2-Button Laser Mouse	**Scroll Wheel**	24	
	Maximum Rotation Speed	48 rats/sec	
	Switch Type	wheel	
	Switch Life	Button - 3,000,000 Wheel - 1,000,000 times Tilt switch - 500,000 times	
	Environmental	**Operating Temperature**	32° to 104° F (0° to 40° C)
		Non-operating Temperature	-4° to 140° F (-20° to 60° C)
		Operating Humidity	10% to 90% (non-condensing at ambient)
		Non-operating Humidity	20% to 80% (non-condensing at ambient)
		Operating Shock	40 g, six surfaces
		Non-operating Shock	80 g, six surfaces
		Operating Vibration	2-g peak acceleration
		Non-operating Vibration	4-g peak acceleration
	Electrical	**Operating Voltage**	+ 5VDC ± 5%
		Power Consumption	
		MTBF	> 150,000 hrs

Technical Specifications - Input Devices

		ESD	IEC-61000-4-2 criteria B, Contact discharge: +/- 4kV, Air discharge: +/- 8kV
		EMI-RFI	FCC Class B
		PC98	PC 99 Compliant
	Mechanical	**Resolution**	800dpi
		Tracking Speed	25 cm/sec
		Acceleration	0.5mm
		Switch Actuation	0.6N (60gf)
		Switch Life	Button - 3,000,000 Wheel - 1,000,000 times Tilt switch - 500,000 times
		Cable Length	1850mm
		PC98-99	PC99 compliant
	Regulatory Approvals	UL60950-1, UL 94, UL 746 (A-E), UL 796 TUV/GS: EN 60950-1, EN 60825-1 FCC Class B, UL 1950, cUL, TUV GS, CE, C-tick, VCCI, BSMI, RRL	

HP USB Optical Scroll Mouse	**Dimensions** (H x L x W)	1.5 x 4.5 x 2.5 in (3.8 x 11.6 x 6.3 cm)
	Weight	0.27 lb (0.12 kg)
	Cable length	72.8 in (185 cm)

Technical Specifications - Hard Drives

3.5” 7200 RPM Serial ATA Hard Drives	**500 GB**	**Capacity**	500,107,862,016 bytes	
		Height	1 in (2.54 cm)	
		Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA (3.0 Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
		Buffer	16 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2.0 ms
			Average	11 ms
			Full-Stroke	21 ms
		Rotational Speed	7,200 rpm	
		Logical Blocks	976,773,168	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	160 GB	**Capacity**	160,041,885,696 bytes	
		Height	1 in (2.54 cm)	
		Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA (3.0 Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
		Buffer	8 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.9 ms
			Average	9.3 ms
			Full-Stroke	18 ms
		Rotational Speed	7,200 rpm	
		Logical Blocks	312,581,808	
		Operating Temperature	41° to 131° F (5° to 55° C)	

Technical Specifications - Hard Drives

Solid State Drive	**64 GB**	**Capacity**	64 GB	
		NAND Flash Memory	Multi Level Cell (MLC) with wear leveling controller	
		Interface type	SATA 3Gb/sec	
		Dimensions-external (W x H x D)	2.74 x 0.37 x 4 in (6.98 x 0.95 x 10.2 cm)	
		Weight	0.14 lb (65 g)	
		Internal transfer rate	**Write speed**	Up to 220 MB/s
			Read speed	Up to 120 MB/s
		Host transfer rate	**Ultra DMA mode**	Up to 150 MB/s
		Power	**DC power requirement**	5 VDC 5%-100 mV ripple p-p
			Total power consumption	<1.12Watt
		Environmental (all conditions, non-condensing)	**Temperature** (operating)	32° to 158° F (0° to 70° C)
			Relative Humidity (operating)	5% to 95%
			Maximum Wet Bulb Temperature (operating)	84° F (29° C)
		Regulations	UL, CSA, EN 60950-2000, CISPR Pub 22 Class B, CNS 13438, AS/NZS CISPR 22:2002 Class B, R1113 and C1172 Class B	

NOTE: For solid state disk drives, GB means 1 billion bytes. 16GB is the unformatted capacity of this drive before a portion of the drive is reserved for flash management features. Actual capacity varies by content and will be less than 15.8GB.

Technical Specifications - Optical Storage

SATA DVD-ROM Drive	**Height**	5.25-inch, half-height, tray-load		
	Orientation	Either horizontal or vertical		
	Interface type	SATA/ATAPI		
	Disc capacity	Single layer: Up to 4.7 GB (6 times capacity of CD-ROM) Double layer: Up to 8.5 GB (12 times capacity of CD-ROM)		
	Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)		
	Weight (max)	2.6 lb (1.2 kg)		
	Read speeds	**DVD+R/-R/+RW/ -RW/+R DL /-R DL**	Up to 8X	
		DVD-ROM	Up to 16X	
		DVD-RAM	Up to 4X	
		CD-ROM, CD-R	Up to 48X	
		CD-RW	Up to 32X	
	Removable Storage - Media Compatibility - DVD-ROM	**Media**	**Read**	**Write**
		CD-ROM	Yes	No
		CD-R	Yes	No
		CD-RW	Yes	No
		DVD-ROM	Yes	No
		DVD-ROM DL	Yes	No
		DVD-RAM	Yes	No
		DVD+R	Yes	No
		DVD+R DL	Yes	No
		DVD+RW	Yes	No
		DVD-R	Yes	No
		DVD-RW	Yes	No
		DVD-R DL	Yes	No
	Access times (typical reads, including setting)	**Random**	DVD: < 140 ms (typical), CD: < 125 ms (typical)	
		Full Stroke	DVD: < 250 ms (seek), CD: < 210 ms (seek)	
		Cache Buffer	2 MB (minimum)	
		Data Transfer Modes	ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 3 (44.4 MB/s -default)	
	Power	**Source**	SATA DC power receptacle	
		DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p	
		DC Current	5 VDC - <1000 mA typical, < 1600 mA maximum 12 VDC -< 600 mA typical, < 1400 mA maximum	

Technical Specifications - Optical Storage

	Environmental (all conditions non-condensing)	**Temperature**	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 90%
		Maximum Wet Bulb Temperature	86° F (30° C)
HP SATA SuperMulti LightScribe DVD Writer Drive	**Height**	5.25-inch, half-height, tray-load	
	Orientation	Either horizontal or vertical	
	Interface type	SATA/ATAPI	
	Disc capacity	8.5 GB DL or 4.7 GB standard	
	Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)	
	Weight (max)	2.6 lb (1.2 kg)	
	Write speeds	**DVD-RAM**	Up to 12X
		DVD+R	Up to 16X
		DVD+RW	Up to 8X
		DVD+R DL	Up to 8X
		DVD-R DL	Up to 8X
		DVD-R	Up to 16X
		DVD-RW	Up to 6X
		CD-R	Up to 48X
		CD-RW	Up to 32X
	Read speeds	**DVD-RAM**	Up to 12X
		DVD+RW, DVD-RW, DVD+R DL, DVD-R DL	Up to 8X
		DVD-ROM DL	Up to 8X
		DVD-ROM, DVD+R, DVD-R	Up to 16X
		CD-ROM, CD-R	Up to 48X
		CD-RW	Up to 32X
	Access time (typical reads, including settling)	**Random**	DVD: < 140 ms (typical), CD: < 125 ms (typical)
		Full Stroke	DVD: < 250 ms (seek), CD: < 210 ms (seek)
	Power	**Source**	SATA DC power receptacle
		DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p
		DC Current	5 VDC (< 1000 mA typical, 1600 mA maximum) 12 VDC (< 600 mA typical, 1400 mA maximum)
	Environmental conditions (operating - non-condensing)	**Temperature**	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 90%
		Maximum Wet Bulb Temperature	86° F (30° C)

Technical Specifications - Optical Storage

HP SATA Blu-ray Writer	5.25-inch, half-height, tray-load			
	Orientation	Either horizontal or vertical		
	Interface type	SATA/ATAPI		
	Disc capacity	50 GB DL or 25 GB standard		
	Dimensions (W x H x D)	5.9 x 1.7 x 7.5 in (15.0 x 4.4 x 19.0 cm)		
	Weight (max)	2.0 lb (907g)		
			Single-layer	**Double-layer**
	Write speed	**BD-R**	2x, 4x CLV, 6x CAV	2x, 4x CLV
		BD-RE	2.3x	2x CLV
		DVD-R	2x, 4x CLV, 8x ZCLV, 8x, 12x PCAV, 16x CAV	2x, 4x CLV
		DVD-RW	1x, 2x, 4x, 6x CLV	Not supported
		DVD+R	2.4x, 4x CLV, 8x ZCLV, 8x, 12x PCAV, 16x CAV	2.4x, 4x CLV
		DVD+RW	2.4x, 4x, 6x CLV, 8x ZCLV	Not supported
		DVD-RAM	2x, 3x CLV, 3-5x PCAV	
		CD-R	8x,16x CLV, 24x, 32x PCAV, 40x CAV	
		CD-RW	4x, 10x, 16x CLV, 24x ZCLV	
			Single-layer	**Double-layer**
	Read speeds	**BD-ROM**	6x CAV	4.8x CAV
		BD-R	6x CAV	4.8x CAV
		BD-RE (SL/DL)	4.8x CAV	4.8x CAV
		DVD-ROM	16x CAV	8x CAV
		DVD-R	12x CAV	8x CAV
		DVD-RW	10x CAV	Not support
		DVD+R	12x CAV	8x CAV
		DVD+RW	10x CAV	Not support
		BDMV (AACS Compliant Disc)	4.8x CAV	
		DVD-RAM	2x, 3x CLV, 3x-5x PCAV	
		DVD-Video (CSS Compliant Disc)	8x CAV	
		CD-R/RW/ROM	40x / 40x / 40x CAV	
		CD-DA (DAE)	32x CAV	
		80 mm CD	16x CAV	
	Sustained Transfer rate	**BD-ROM**	215.79 Mbits/s (6x) max.	
		DVD-ROM	16.62 Mbytes/s (16x) max.	
		CD-ROM	6,000 KB/s (40x) max.	

Technical Specifications - Optical Storage

Burst Transfer rate		1.5Gbps bits/s (10b side) 1.2Gbps bits/s (8b side)
Multimedia MPC-3 compliant		Yes
Access times (typical reads, including setting)	**Random**	DVD: < 140 ms (typical), CD: < 125 ms (typical)
	Full Stroke	DVD: < 250 ms (seek), CD: < 210 ms (seek)
Power	**Source**	SATA DC power receptacle
	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p
	DC Current	5 VDC -1000 mA typical, 1600 mA maximum 12 VDC -600 mA typical, 1400 mA maximum
Environmental (all conditions non-condensing)	**Temperature** (operating)	41° to 122° F (5° to 50° C)
	Relative Humidity (operating)	10% to 90%
	Maximum Wet Bulb Temperature (operating)	86° F (30° C)

Technical Specifications - Removable Storage

HP 22-in-1 Media Card Reader	**USB interface**	USB 2.0 High-speed device via PCI card or pass -through via internal USB port of system board	
	Advance protocol support	• Supports hardware ECC (Error Correction Code) function • Supports hardware CRC (Cyclic Redundancy Check) function • Supports MS 4-bit parallel transfer mode • Supports MS-PRO 4-bit parallel transfer mode • Supports SD 4-bit parallel transfer mode • Supports high-speed 50 MHz SD 4-bit card (version 1.1) • Support high-speed 52 MHz MultiMediaCard 8-bit card (version 4.x)	
	Supported media types	• Supports CompactFlash Card Type I (CF I), CompactFlash Card Type II (CF II),MicroDrive (MD) • Supports 3.3V SmartMedia Card (SM), SmartMedia ROM (SM ROM), Picture Card • Supports Secure Digital Card (SD), Secure Digital ROM Card (SD ROM), miniSD, MultiMediaCard, Secure MultiMediaCard (Secure MultiMediaCard), ROM Type MultiMediaCard (MultiMediaCard ROM), Reduced Size MultiMediaCard (RS MultiMediaCard), MultiMediaCard 4.0 (MultiMediaCard Plus), Reduced Size MultiMediaCard 4.0 (MultiMediaCard Mobile) • Support Memory Stick (MS), Memory Stick ROM (MS ROM), MagicGate Memory Stick (MG), Memory Stick Select, Memory Stick Duo (MS Duo), Memory Stick PRO (MS-PRO), Memory Stick PRO Duo (MS PRO Duo)	
	Mechanical	**Length** (3.5")	124.7 cm
		Width (3.5")	101.6 cm
		Height (3.5")	25.4 cm
		Length (5.25)	171.6 cm
		Width (5.25")	148.9 cm
		Height (5.25")	42.7 cm
	Environmental	**Operational environmental extremes**	Test Parameters/Conditions - Power applied, unit operating on system ±5% nominal supply voltage. 10°C 10% R.H. = 24 hours 10°C 90% R.H. = 24 hours 20°C 90% R.H. = 24 hours 30°C 90% R.H. = 24 hours 40°C 90% R.H. = 24 hours 50°C 90% R.H. = 24 hours 50°C 10% R.H. = 24 hours
		Storage environmental extremes	Test Parameters/Conditions 60°C @ 80% R.H. for 96 hours -30°C @ 20% R.H. for 48 hours No power applied Delta °C < 1.0°C/min Delta % R.H. < 1.5% R.H./min

Technical Specifications - Removable Storage

Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.2 FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T

Technical Specifications - Environmental Data

Eco-Label Certifications & declarations

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- IT ECO declaration

System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Ultra-slim Desktop model is based on a typically configured product

Energy Consumption	115 VAC	230 VAC	100 VAC
Normal Operation	49.39 W	49.61 W	49.48 W
Sleep (Energy Star low power mode)	2.83 W	2.99 W	2.73 W
Off	0.58 W	0.78 W	0.56 W

Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation	169 BTU/hr	170 BTU/hr	169 BTU/hr
Sleep	10 BTU/hr	10 BTU/hr	9 BTU/hr
Off	2 BTU/hr	3 BTU/hr	2 BTU/hr

* Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)

System Fan Off	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	3.3	22
Fixed Disk (random writes)	3.4	23

Batteries

This battery(s) in this product comply with EU Directive 2006/66/EC

Batteries used in the product do not contain:

- Mercury greater the 5ppm by weight
- Cadmium greater than 10ppm by weight

Battery size: CR2032 (coin cell)
Battery type: Li-Metal

Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product contains 0% post consumer recycled plastic (by wt.)
- This product is 91.5% recyclable when properly disposed of at end of life.

Packaging Materials

- External:
  - Corrugated 2260 g
- Internal:
  - Polyethylene low density 15 g
  - Polyethylene low density Foam 115 g
- The corrugated paper packaging materials contains at least 38% recycled content.

RoHS Compliance

Hewlett-Packard is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis. By July 1, 2006, RoHS substances will be virtually eliminated (virtually = to levels below legal limits) for all HP electronic products subject to the RoHS Directive, except where it is widely recognized that there is no technically feasible alternative (as indicated by an exemption under the EU RoHS Directive).

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at: http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants - may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Nickel - finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) - except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

Packaging

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

End-of-life Management

Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas.

Technical Specifications - Environmental Data

and Recycling	To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.
Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

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